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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/895,511	06/29/2001	Ted Liang	042390P11354	8234

7590 10/27/2003  
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EXAMINER
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ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 10/27/2003

10

Please find below and/or attached an Office communication concerning this application or proceeding.

CLO - 10

**Office Action Summary**

Application No.

09/895,511

Applicant(s)

LIANG ET AL.

Examiner

Rudy Zervigon

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 August 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 requires electrons “comprising a tail diameter of about 5-125nm”. The only citation in the application of a “tail diameter” is in the first paragraph of page 14 – “an electron beam has a typical tail diameter of about 5-125nm”. As a result, claim 1, and it’s dependents, contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. Further, the specification requires that the “electron beam” has a “tail diameter”, whereas claim 1 requires that the “electrons” have a “tail diameter”.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. An electron-volt (eV) is a unit of energy, not a “voltage”. The eV is treated below as an energy unit as is conventionally accepted.

***Claim Rejections - 35 USC § 103***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Casey, Jr. et al (USPat. 6,042,738). Casey teaches an apparatus (Figure 1) including:

- i. A holder (26) adapted to mount a substrate (30)
- ii. A stage (24) adapted to position the holder in a chamber (22)
- iii. A pumping system ("vacuum chamber 22"; column 4, lines 31) adapted to evacuate the chamber
- iv. An ion column (column 3, lines 8-16, "image and mill the workpiece"; column 4, lines 5-10) imaging system (54; column 4, lines 38-45; column 5, lines 5-10) adapted to locate (column 6, lines 17-30) an opaque defect (abstract; column 1, lines 5-10; column 2, lines 28-50; column 8, line 62 – column 9, line 2; ) in the substrate
- v. A gas delivery system (34; column 5, lines 22-38) adapted to dispense a reactant gas towards the defect
- vi. An ion column delivery system (12/14; column 4, lines 27-35, 45-63; "image and mill the workpiece"; column 4, lines 5-10) adapted to direct ions towards the opaque defect (column 3, lines 60-65)
- vii. DUV/EUV mask substrate (column 1, lines 35-45)
- viii. Chrome opaque defect (column 3, lines 3-4; line 55)
- ix. An ion focusing system (18; column 4, lines 28-44) and scanning system (62, column 4, lines 39-43)

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- x. An acceleration system ("JEOL Model 6400") providing a low acceleration voltage (column 9, lines 20-25)
- xi. A computer controller (50, column 4, lines 38-45; column 7, lines 33-44) adapted to control the ion delivery system

Casey does not teach components of an electron delivery/imaging system.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Casey's specific example of a particle beam as an ion delivery/imaging system with Casey's alternate and equivalent example of a particle beam as an electron delivery/imaging system (column 3, lines 8-12, 66-67).

Motivation to replace Casey's specific example of a particle beam as an ion delivery/imaging system with Casey's alternate and equivalent example of a particle beam as an electron delivery/imaging system is to provide an alternate and equivalent means for imaging and milling a workpiece (column 4, lines 6-10; column 3, lines 8-12, 66-67).

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Casey, Jr. et al (USPat. 6,042,738) in view of Katzschner et al (USPat. 4,987,346). Casey is discussed above.

Casey does not teach that his low acceleration voltage is in a range of 0.3-3.0 keV.

Katzschner teaches an electron beam source with a variable particle energy within the range of "< 10 keV" (column 4, line 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize Casey's electron beam source with a variable particle energy within the range of 0.3-3.0 keV, as taught by Katzschner.

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Motivation to optimize Casey's electron beam source with a variable particle energy within the range of 0.3-3.0 keV, as taught by Katzschner is for modifying properties and features of substrate surfaces (column 3, lines 63-69). Further, it would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

### ***Response to Arguments***

8. Applicant's arguments filed August 11, 2003 have been fully considered but they are not persuasive.

9. In response to applicant's argument that "Applicant's invention is completely unlike the apparatus taught by Casey" because "Applicant's invention envisions an apparatus for electron beam induced chemical etching without any concurrent FIB milling.", a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

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10. Applicant is directed to the above rejections for the remainder of Applicant's arguments centered on the amendments to the claims filed.

***Conclusion***


11. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner

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can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.



JEFFRIE R. LUND  
PRIMARY EXAMINER